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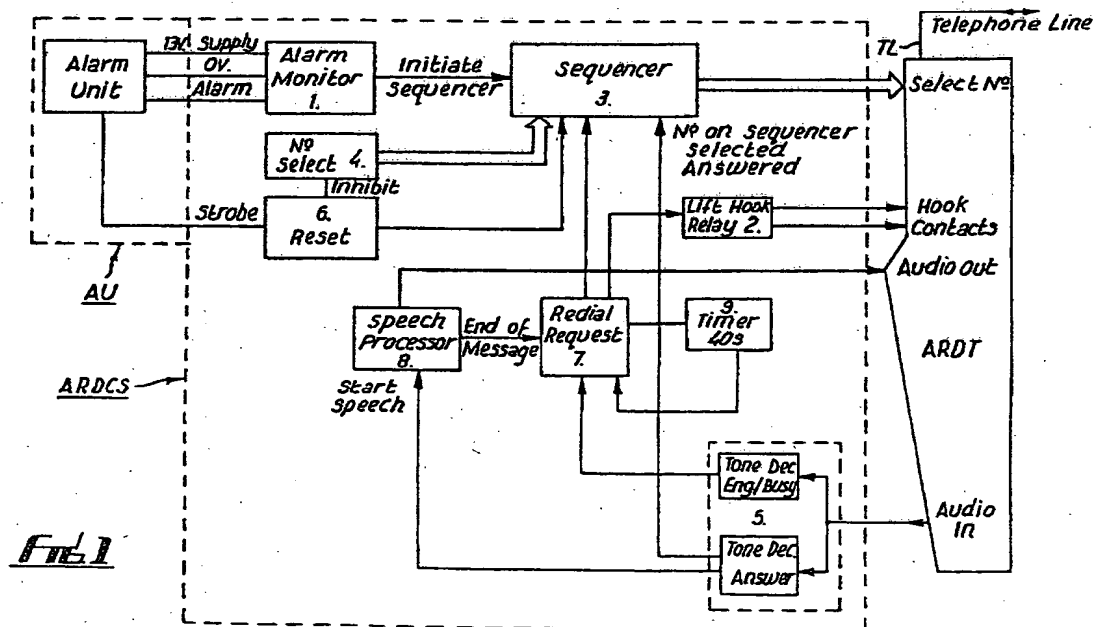
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(58) Field of search
UK CL (Edition K) H4K KFD KOB
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(57) An automatic repertory dialler control system for use with an automatic telephonic message system and an automatic repertory dialler telephone connected to a telephone line, e.g. as an alarm system, is arranged to dial a selected one or a number of predetermined telephone numbers in a given sequence and transmit a message to the connected number(s). The message may relate to burglary or fire. The system distinguishes between ringing out, busy and unobtainable tones 5 and acts accordingly thus saving time. Additionally the system only contacts selected stored numbers thus reducing intrusion, also the system uses a hook relay 2 and so cannot be hung-up or impeded by an external caller. The system can also be used as a programmable auto-search exchange (locating Mr X at one of several numbers for a caller) or a programmable auto-search telephone (for getting through to very busy telephone numbers).



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

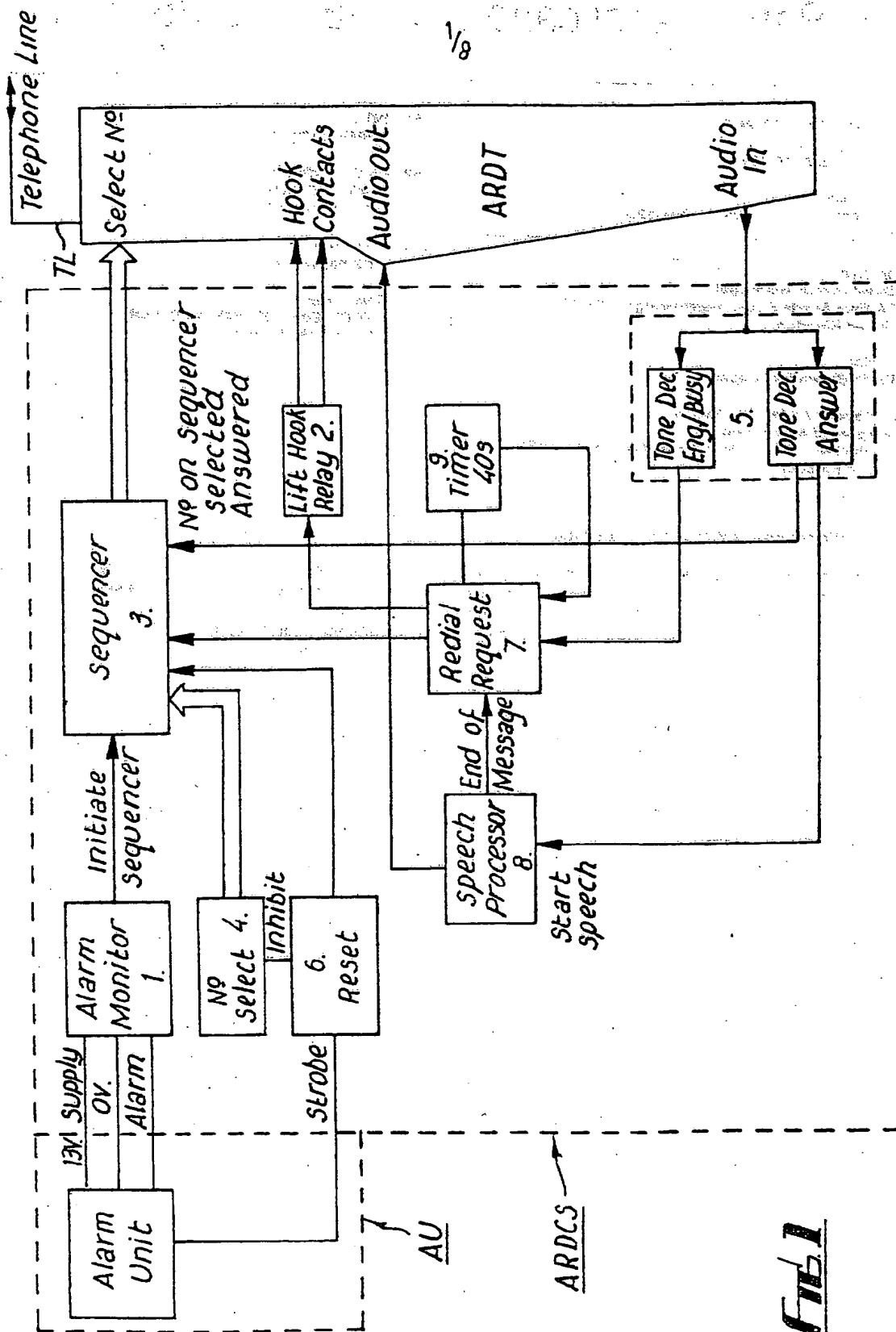
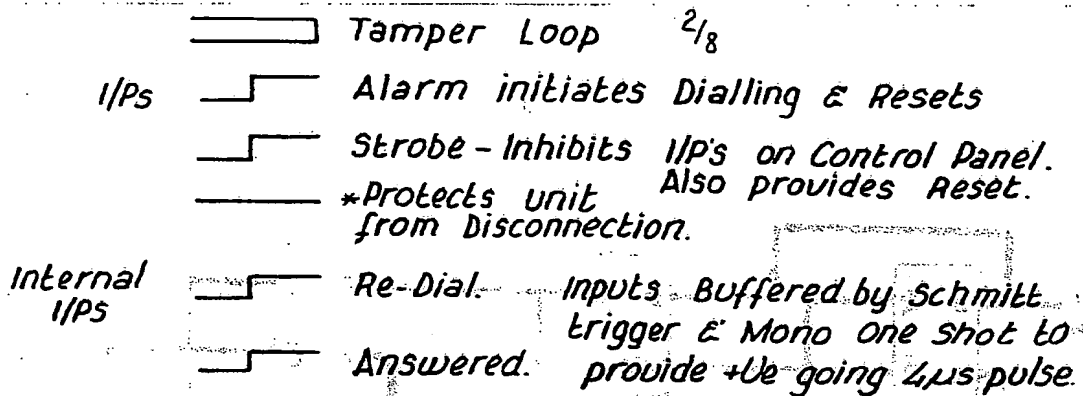


Fig 1



Alarm I/P Trigger Circuit

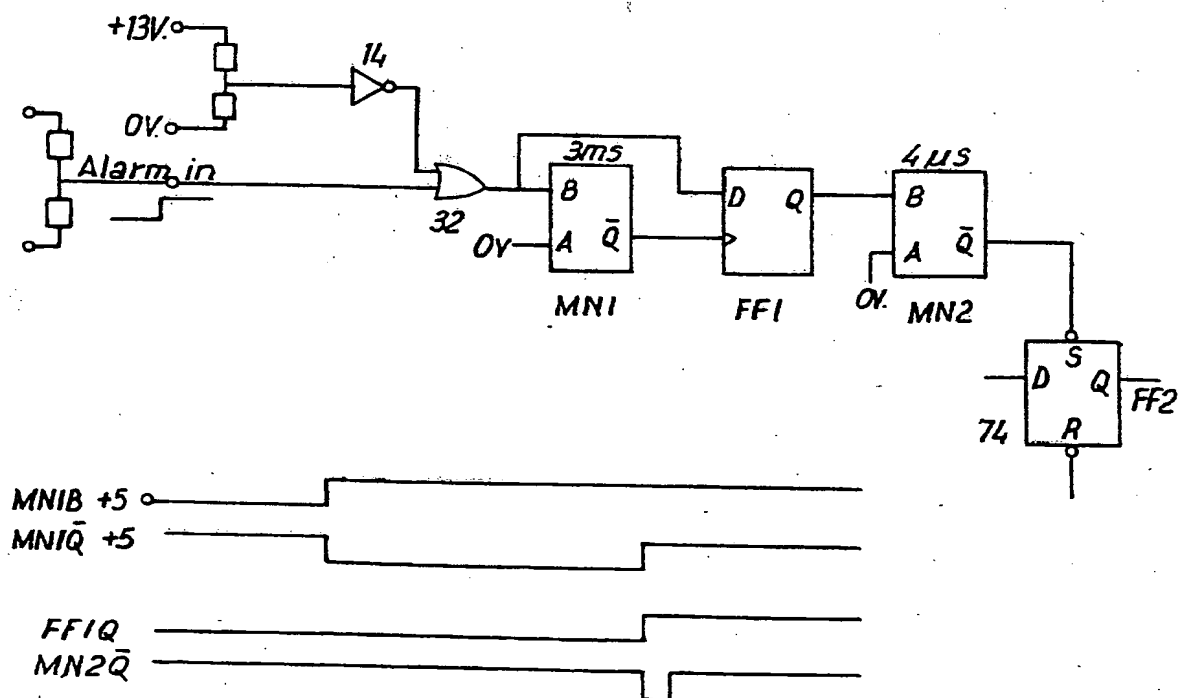


FIG. 2

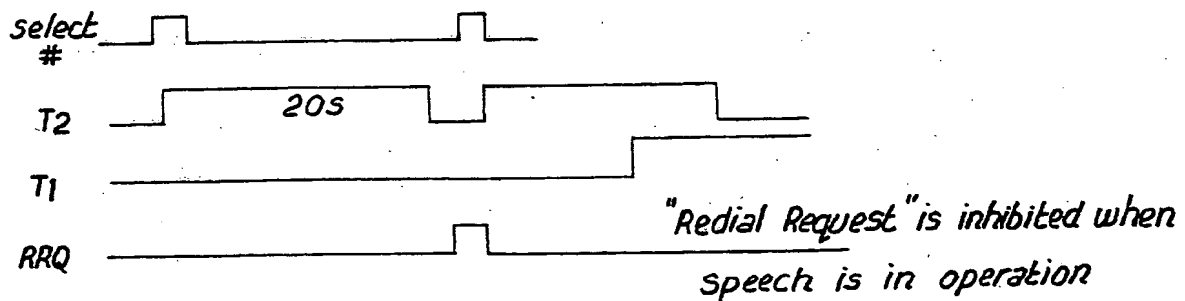
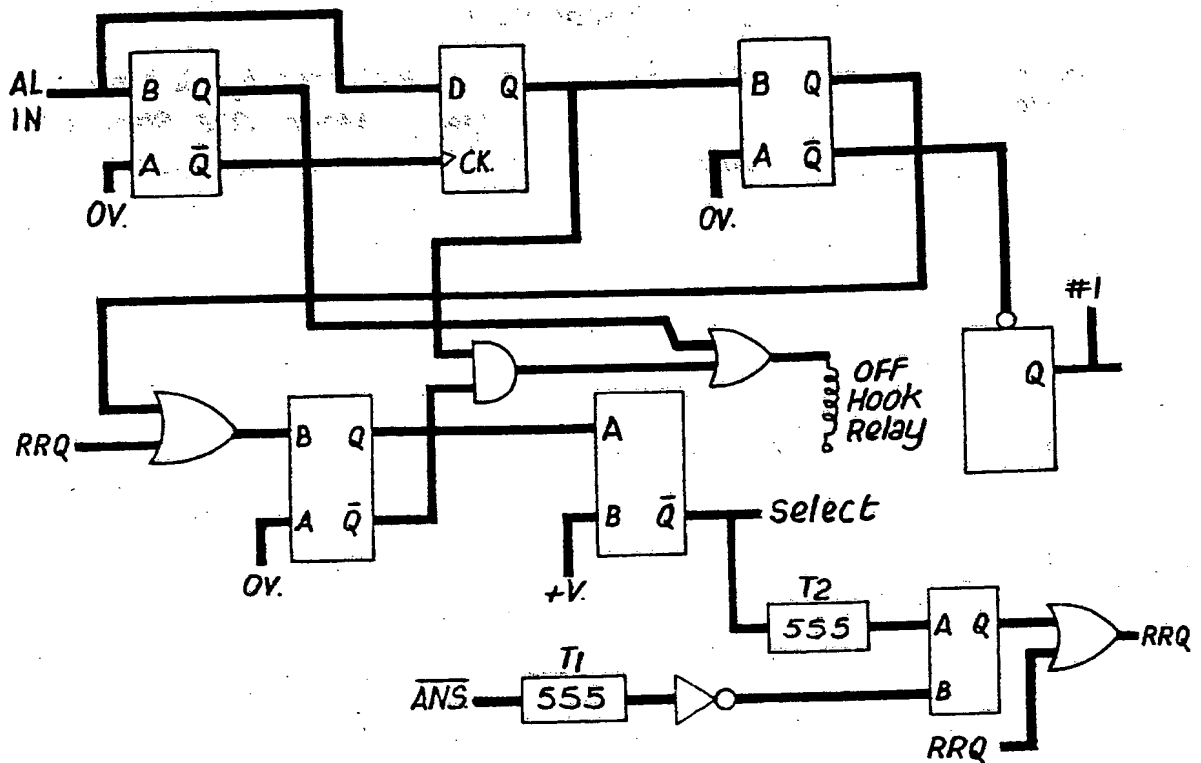
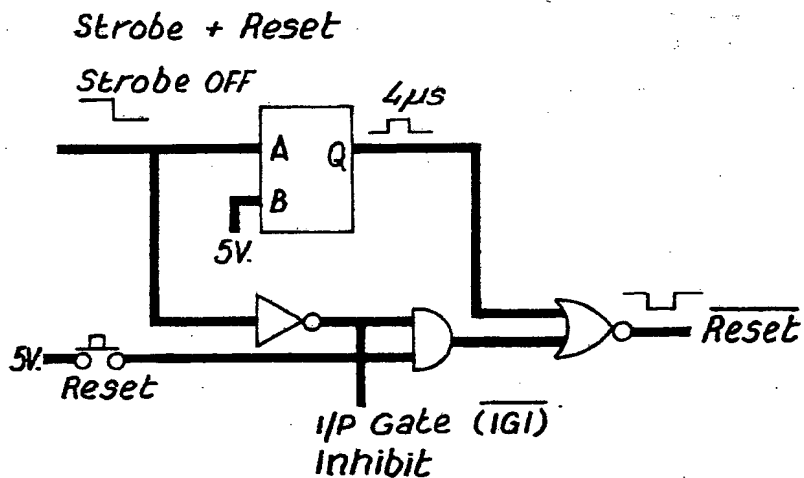
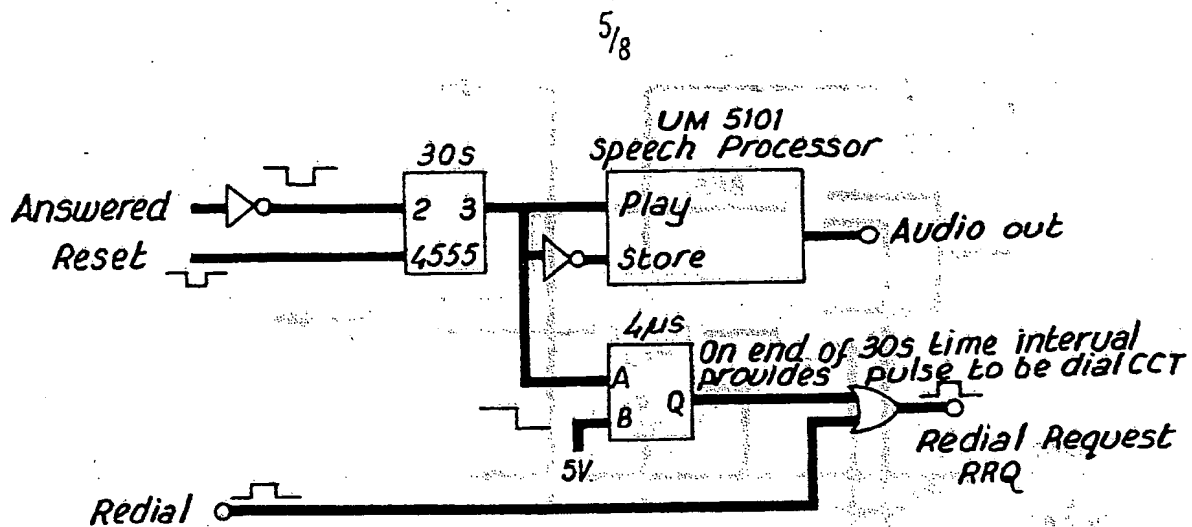


Fig. 3



Inhibits I/P gates when
strobe is on will only
enable I/Ps when strobe
o/p is switched off.
I.E. Alarm is reset by key.

FIG. 5

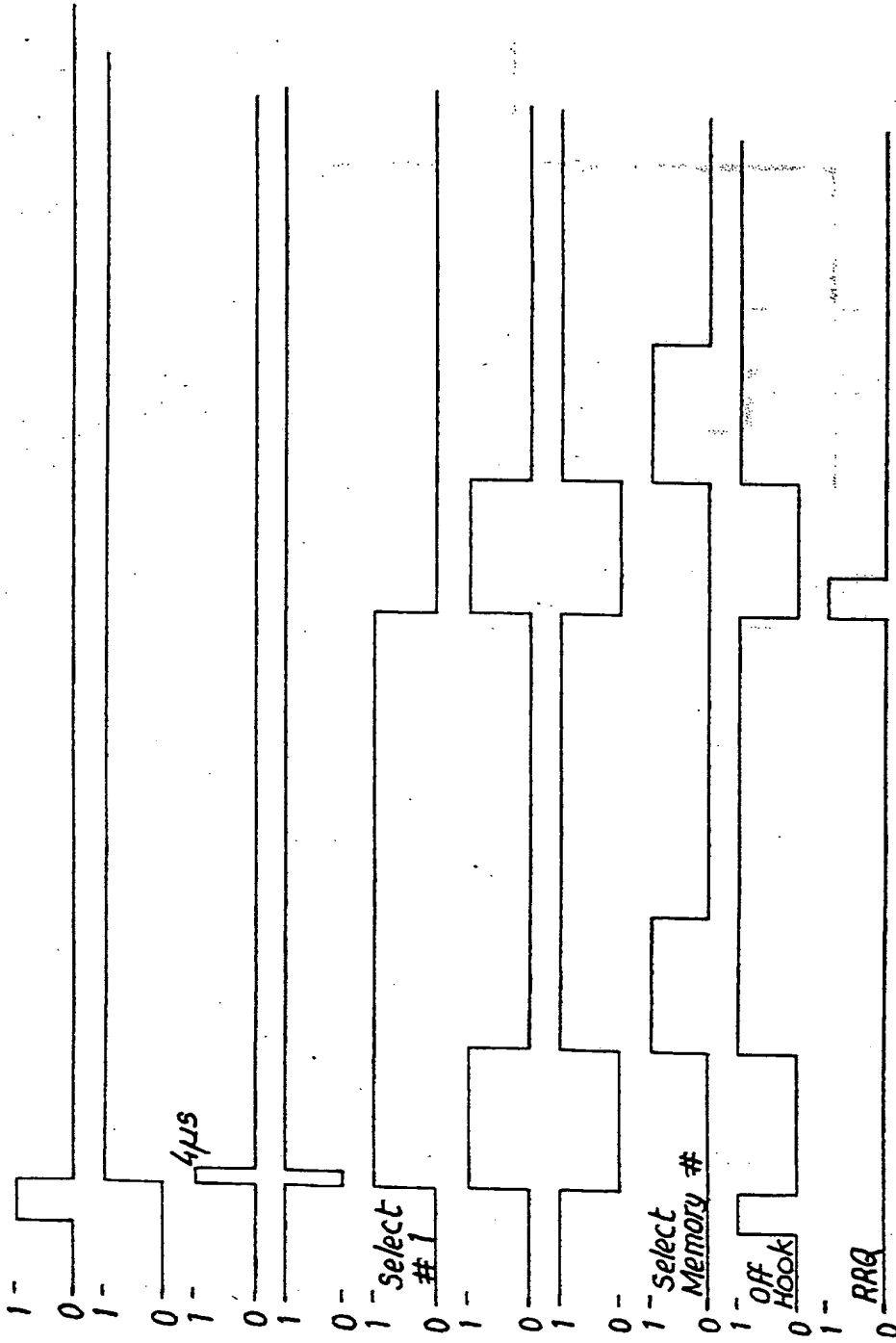


Fig. 6

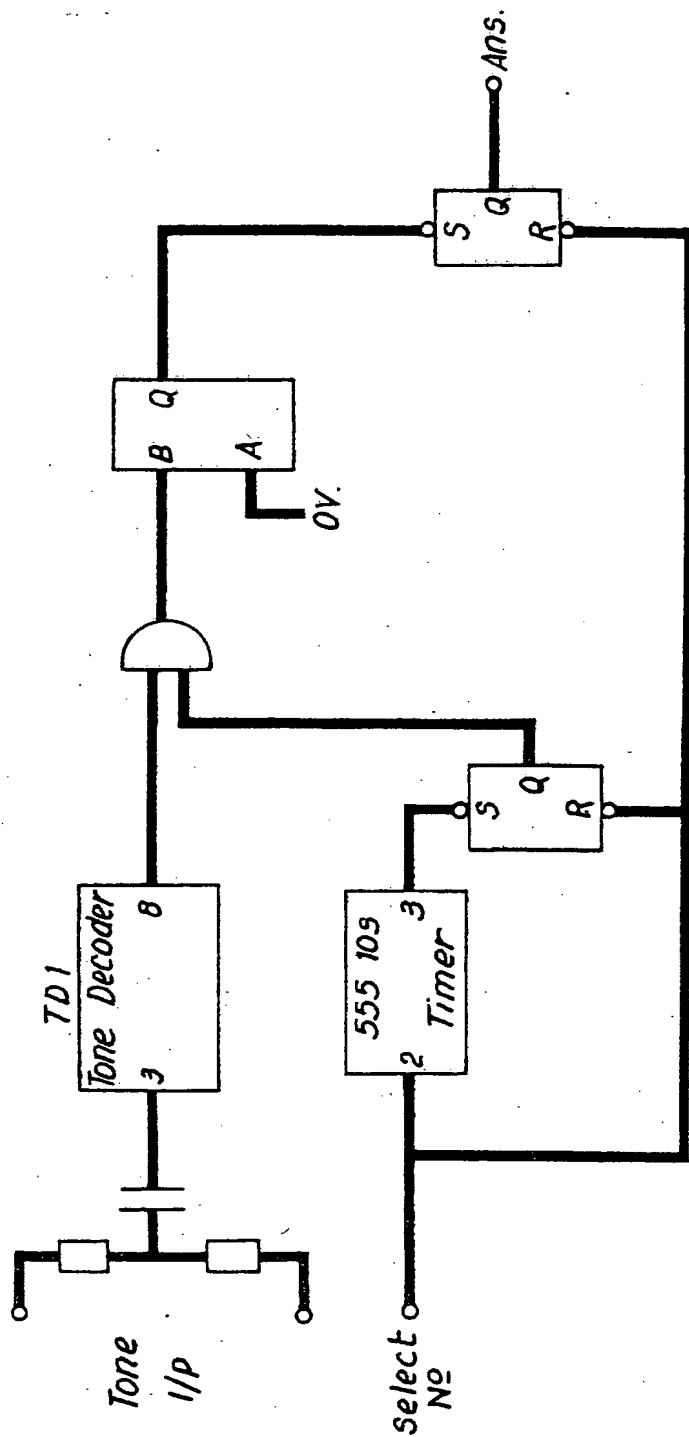
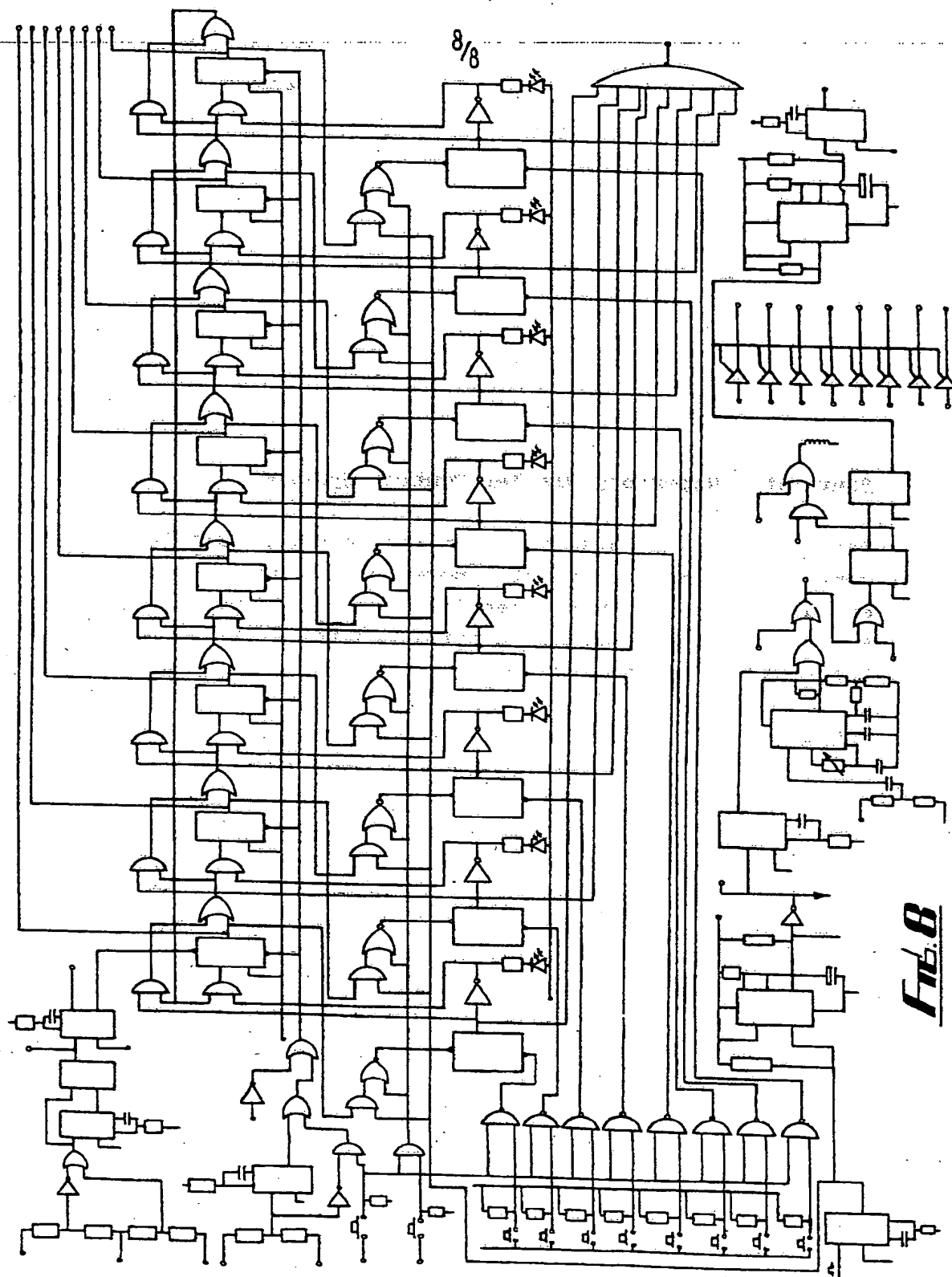


Fig. 7



1 "Automatic Repertory Dialler Control Systems"

2

3 This invention relates to automatic repertory dialler
4 control systems, and relates more particularly but not
5 exclusively to automatic repertory dialler control
6 systems for automatically controlling the multiple
7 transmission of telephone alarm messages.

8

9 Automatic repertory diallers are known and are
10 commercially available, in which an otherwise
11 conventional telephone handset is modified by the
12 incorporation of an electronic memory and control
13 system by means of which any selected one of up to ten
14 pre-programmed telephone numbers can be dialled merely
15 by the operation of a single switch (usually preceded
16 by the transfer of the handset to the repertory
17 dialling mode by means of a switch-selected code
18 signal). It is to be noted that the term "dialling" is
19 employed by convention to encompass two-out-of-four
20 tone keying operations equivalent to dialling
21 operations on a handset's rotary line breaker as
22 originally employed to actuate Strowger line selectors.

23

24 Automatic telephone alarm systems are also known in
25 which premises are protected against burglary and/or

1 fires, and upon an intrusion or fire alarm signal being
2 initiated, such a system automatically dials a
3 predetermined telephone number (e.g. to a Police
4 Station or to a control centre) and, when connected,
5 transmits a pre-recorded verbal alarm message. Such
6 automatic telephonic alarm systems may be arranged to
7 transmit telephonic alarm messages to more than one
8 predetermined telephone number.

9
10 There are at present two types of burglar alarm systems
11 which perform an automatic telephone message function.
12 One is named the "Auto-dialler" and the other is named
13 the "Digital Communicator".

14
15 The "Auto-dialler" has several shortcomings, such as:-
16

17 a) The circuit spends between three and five minutes
18 trying to get through to each of the stored telephone
19 numbers, because the circuit cannot recognise and act
20 on the Tone Information which is readily available.
21

22 b) Some systems only try to get through to a stored
23 number once, and once only, and deliver it's stored
24 message whether the phone at the other end of the line
25 is answered or not.
26

27 c) Other systems keep on going round and round,
28 dialling each of the stored numbers in turn, delivering
29 the stored message, even although the phone at the far
30 end has indeed been answered, and the message received.
31 This system continues to cycle through each of the
32 stored numbers until someone cancels the alarm. This
33 means that such a system with four stored numbers,
34 taking three minutes per number, will call you up as a
35 recipient, once every nine minutes and deliver it's

1 stored message, until as we said earlier, someone
2 cancels the alarm.

3
4 d) A burglar can effectively Hang-Up these systems by
5 phoning it's number prior to breaking into the
6 premises.

7
8 The "Digital Communicator", on the other hand, deals
9 directly with a Control Centre and has the following
10 shortcomings:-

11
12 a) there is an annual fee to be paid;

13
14 b) unacceptable delays are possible, depending on how
15 busy the British Telecom exchanges are and how busy the
16 lines are into the Control Centre;

17
18 c) there is reduced security due to third party
19 involvement;

20
21 d) there is a further possible delay, namely the time
22 taken for the Control Centre to contact the owner of
23 the alarmed premises or his nominated representative.

24
25 According to a first aspect of the present invention
26 there is provided an automatic repertory dialler
27 control system for use with an automatic telephonic
28 message system and an automatic repertory dialler
29 telephone connected to a telephone line, said automatic
30 telephonic message system functioning when
31 telephonically connected via said telephone line to a
32 called telephone number to transmit a predetermined
33 message thereto, said automatic repertory dialler
34 telephone being preprogrammable with a plurality of
35 predetermined telephone numbers and functioning when

1 initiated in the repertory dialling mode to dial a
2 selected one of said predetermined telephone numbers,
3 said automatic repertory dialler control system being
4 coupled in use to said automatic telephonic message
5 system and to said automatic repertory dialler
6 telephone, said automatic repertory dialler control
7 system functioning in use upon initiation of an
8 automatic telephonic message function to cause said
9 automatic repertory dialler telephone to dial the first
10 of said predetermined telephone numbers, to recognise a
11 resultant telephone line tone or tones indicating the
12 success or failure of the connect attempt, upon
13 recognition of a successful connection to said first
14 predetermined telephone number to cause the message
15 system to transmit said predetermined message, then
16 either upon the completion of the transmission of said
17 predetermined message or upon recognition of a failure
18 to connect to said first predetermined telephone
19 number, to repeat the foregoing functional steps in
20 respect of the second and then subsequent ones of said
21 predetermined telephone numbers and to continue through
22 said plurality of predetermined telephone numbers until
23 the foregoing functional steps have been carried out in
24 respect of the last of said predetermined telephone
25 numbers. Preferably, there are included means whereby,
26 if said predetermined message has not been transmitted
27 to any one or more of said predetermined telephone
28 numbers, to repeat the foregoing cycle in respect of
29 the predetermined telephone number or numbers to which
30 said predetermined message has not been transmitted,
31 and to continue cycling as aforesaid either until said
32 predetermined message has been transmitted to each of
33 said predetermined telephone numbers, or until said
34 functioning of said automatic repertory dialler control
35 system is terminated.

1 According to a second aspect of the present invention
2 there is provided an automatic repertory dialler
3 control system as aforesaid, in combination with and
4 coupled to an automatic telephonic message system and
5 an automatic repertory dialler telephone.

6
7 Said automatic telephonic message system may comprise
8 or be comprised in an alarm system, which alarm system
9 may be adapted to the automatic protection of premises
10 against intrusion and/or fire.

11
12 Embodiments of the invention will now be described by
13 way of example.

14
15 For convenience, the term "automatic repertory dialler
16 control system" will hereinafter be referred to by its
17 abbreviation "ARDCS".

18
19 In the present invention, the ARDCS can be used in
20 conjunction with any commercially available
21 ten-number-memory telephone (suitably modified) and any
22 commercially available alarm unit with bell, strobe,
23 and a 13 volt supply output. The ARDCS constantly
24 monitors the alarm unit. When the ARDCS has been
25 pre-programmed to dial a pre-selected number of
26 telephone numbers stored in the ten-number-memory
27 telephone and then set, the ARDCS cannot be tampered
28 with. Any alarm, from the burglar alarm unit, fire
29 detector unit, etc., will then set the sequencer in the
30 ARDCS in motion. A "lift hook" signal is initially
31 generated to ensure anyone holding the line from an
32 external source is immediately disconnected and the
33 first number held in the ten-memory phone is dialled
34 out without further delay. If the line is found to be
35 engaged or busy, the British Telecom tones are decoded,

1 recognised as unavailable, and the sequencer
2 immediately selects the next programmed number and so
3 on, until a through-connected line is recognised. When
4 the line is answered, the speech processor is initiated
5 and delivers its stored message to the recipient at the
6 other end of the line. The ARDCS then times out and
7 generates a "redial request" signal and the next stored
8 number in the chosen order of priority is then
9 accessed. The sequencer goes through each of the
10 pre-selected numbers in turn. When the message is
11 successfully transmitted, then that number will not be
12 dialled or re-dialled again. If the line response
13 tones are decoded as being "busy" or "engaged", or
14 times out because no one answers, then the number will
15 be tried again when the sequencer cycles around to that
16 number again. This process will continue until the
17 stored message has been delivered to each of the
18 pre-programmed numbers, or until the ARDCS is reset by
19 its owner or his nominated representative.

20
21 Exemplary embodiments of the invention will now be
22 detailed with reference to the accompanying drawings
23 wherein:-

24
25 Fig. 1 is a block schematic diagram of a preferred
26 arrangement of ARDCS in accordance with the
27 invention;

28 Figs. 2 to 7 illustrate various functional
29 sub-sections of the ARDCS of Fig. 1; and
30 Fig. 8 is a circuit diagram of the ARDCS of
31 Fig. 1.

32
33 Referring first to the block schematic of Fig. 1, the
34 preferred ARDCS can be functionally divided into the
35 following blocks (numbered as shown in Fig. 1):-

- 1 1. The alarm monitor.
- 2
- 3 2. The lift hook pulse generator and hook relay.
- 4
- 5 3. The sequencer.
- 6
- 7 4. The program selector.
- 8
- 9 5. The tone decoder.
- 10
- 11 6. The reset generator.
- 12
- 13 7. The redial request generator.
- 14
- 15 8. The speech processor plus timer.
- 16
- 17 9. The dial timer.
- 18
- 19 10. The dial number output buffer.
- 20

21
22 The ARDCS of Fig. 1 is shown connected to a burglar
23 and/or fire alarm unit AU. The automatic repertory
24 dialler telephone ARDT is connected to the ARDCS
25 through the various signal lines functionally
26 designated on the right of Fig. 1. The ARDT is also
27 connected to a telephone line TL. (The term "audio"
28 refers to audio-frequency signals in general, including
29 AF line tones, and pre-recorded speech).

30
31 The ARDCS of Fig. 1 functions as follows:-

32
33 Upon connection and switch-on, the ARDCS is manually
34 reset. The ten-memory telephone is programmed with up
35 to ten numbers that can be accessed, whereby one, two,

1 or up to eight, the case of the ARDCS, numbers can be
2 selected by pressing a push button selection from one
3 to eight on the ARDCS. This resets the required
4 'select' flip-flops of the sequencer. If a number is
5 not selected, the 'select' flip-flop remains set and
6 causes the sequencer to by-pass that number; this also
7 happens when the 'select' flip-flop is set upon a
8 particular selected number being answered and the
9 pre-recorded alarm message being successfully
10 transmitted. Once the alarm has been triggered, these
11 push buttons are then inhibited. An LED on the front
12 panel of the ARDCS confirms which number or numbers
13 have been selected.
14

15 The input alarm monitor, Fig. 2, receives the alarm
16 supply bell output from any standard alarm unit, and by
17 means of a potential divider, provides 5 volts via an
18 OR gate IC 19 to the input of IC 1 pin 2, which is a 3
19 millisecond monostable timer. As a tamper proof
20 precaution, the 13 volt supply bell output from the
21 alarm unit is also monitored, inverted, and connected
22 to the OR gate IC 19. 3 milliseconds after an alarm
23 output is monitored, logic "1" is applied to IC 1 pin
24 2, the Q output clocks the D type flip-flop IC 2, and
25 providing the alarm input is still at 5 volts, the
26 output of D type flip-flop IC 2 goes high, triggering a
27 second monostable; this provides a 4 microsecond pulse
28 output which sets FF 2.
29

30 The 'lift hook' function is depicted in Fig. 3, wherein
31 the output of IC 1 (a 3 millisecond monostable)
32 provides a 3 millisecond signal to lift the hook via
33 the 'lift hook' relay, thus disengaging any input
34 caller on the British Telecom line, which in turn gives
35 a clear line, enabling the outgoing calls to be made.

1 The 'number select' function is depicted in Fig. 4,
2 wherein the Q output of the 4 microsecond monostable
3 IC 1 initiates the dial sequence. The top priority or
4 first number is always dialed first. T2 commences a
5 twenty second time delay and tone decoders TD1 then
6 start monitoring the telephone audio signal for a
7 satisfactory dialling tone, and also monitors via TD2
8 for an 'engaged' or 'busy' tone signal. If T2 times
9 out before the line/number dialled is answered then
10 this initiates a 3 millisecond pulse from a monostable
11 IC 29, "T out", which further initiates a redial
12 request. If the line has been answered, TD1 is high
13 via IC 23, and inhibits the time out timer from
14 producing a redial request, RRQ, i.e. when the speech
15 processor is transmitting its message. This RRQ signal
16 clocks the sequencer flip-flops IC 2b and IC 3, and
17 initiates the next number. If TD1 is interrupted, as
18 depicted in Fig. 7, i.e. the phone is answered before
19 the twenty second timer times out, an ANS signal is
20 generated. The ANS initiates timer T1, which in turn
21 starts the speech processor, whereby the ARDCS will
22 begin to transmit its pre-recorded message via the
23 now-connected telephone line, the message lasting for
24 forty seconds (the time taken to deliver the stored
25 message twice). The ANS signal also sets the flip-flop
26 of the number selected and successfully answered, and
27 means that if the sequencer loops around again, this
28 particular number will not be dialled a second time.
29 After forty seconds, the message having been sent, a
30 RRQ signal is sent selecting the next number to be
31 dialled. If the number dialled is engaged, TD2
32 recognises this and initiates a RRQ signal. On each
33 RRQ signal, the 100 millisecond monostable lifts the
34 hook via the 'lift hook' relay to open the line ready
35 for the next number in the priority sequence to be

1 dialled.

2

3 Once all the sequencer number 'inhibit' flip-flops have
4 been set, an END signal is generated which resets the
5 sequencer to a 'ready for alarm' condition.

6

7 On commercially available alarm systems, the strobe can
8 only be reset by the alarm unit being switched off by
9 an authorised person. 'Strobe off' will reset the dial
10 sequence in the ARDCS, as shown in Fig. 5.

11

12 Fig. 6 shows the sequence of events from "alarm on" or
13 "ALO", to "redial request", or "RRQ".

14

15 The full circuit diagram of the preferred form of ARDCS
16 is shown in Fig. 8, wherein the circuit can be
17 considered as an eight-stage ring counter toggling
18 tone-determined conditional branching logic stages,
19 each including a 'message transmitted' latch with
20 continuous cycling from alarm initiation until all
21 these latches are set.

22

23 Modifications and variations of the above-described
24 ARDCS are possible, as follows:-

25

26 1. The ARDCS could be greatly enhanced by replacing
27 the sequencer with a microprocessor. This would allow
28 a great deal more flexibility; for instance, the
29 pre-programmed telephone numbers could be changed, or
30 have their priority changed, simply by ringing up the
31 telephone number of the premises fitted with an ARDCS
32 and passing a digital signal down the British Telecom
33 line.

34

35 2. With regard to the possibility of the telephone

1 lines being cut with the intent of disabling the
2 burglar alarm, particularly if the lines are overhead
3 lines, it is possible to overcome this difficulty by
4 employing a radio telephone link whereby, say, two
5 alarm numbers are dedicated to a given area. In this
6 way, all ARDCS alarm system users in that area would
7 have a miniature transmitter fitted in (for example)
8 their loft, and if their telephone line were to be cut,
9 then the message would then be sent via the loft
10 transmitter.

11

12 ADVANTAGES OF THE ARDCS OVER EXISTING OR PRIOR ART
13 SYSTEMS:-

14

15 1. Is able to distinguish between Ringing out; Busy;
16 Unobtainable, and immediately act accordingly, thus
17 saving vital time.

18

19 2. Selectivity: ie only contacts those stored numbers
20 that have been selected, and shuts down automatically
21 once all the selected numbers have been contacted and
22 given the stored message, thus keeping intrusion to a
23 minimum.

24

25 3. In using a Hook relay, the ARDCS cannot be Hung-up
26 or impeded in any way, by an external caller, from
27 going about it's normal business of delivering it's
28 stored message or messages.

29

30 4. The time taken for this system to deliver it's
31 stored message to a nominated recipient is far superior
32 to other existing systems.

33

34 The ARDCS could be used to build other units, such as a
35 programmable auto-search exchange or "PASE", which

1 would be used in the home or business, and would do
2 what the name suggests. It would put an incoming call
3 on hold, telling the caller it would make the
4 connection as soon as, say, Mr X was found; meanwhile,
5 the ARDCS would be trying to locate Mr X at one of the
6 numbers the user has programmed into the system. Once
7 Mr X is located, either by voice recognition, (not
8 possible with the illustrated ARDCS), or by Mr X
9 feeding a digital signal down a British Telecom line,
10 the PASE makes the connection between the caller on
11 hold and Mr X.

12
13 Another possible use for the ARDCS would be as a
14 programmable auto-search telephone or "PAST". In its
15 simplest form it would be used to get through to very
16 busy telephone numbers. The user would feed in all the
17 numbers he wished to contact and the ARDCS would do the
18 rest. All the user would have to do is answer his
19 phone as it worked its way through the numbers given
20 it. More involved telephone systems are also possible.

21
22 While certain modifications and variations have been
23 described above, the invention is not restricted
24 thereto, and other modifications and variations can be
25 adopted without departing from the scope of the
26 invention.

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35

1 CLAIMS

2

3

4 1. An automatic repertory dialler control system for
5 use with an automatic telephonic message system and an
6 automatic repertory dialler telephone connected to a
7 telephone line, said automatic telephonic message
8 system functioning when telephonically connected via
9 said telephone line to a called telephone number to
10 transmit a predetermined message thereto, said
11 automatic repertory dialler telephone being
12 preprogrammable with a plurality of predetermined
13 telephone numbers and functioning when initiated in the
14 repertory dialling mode to dial a selected one of said
15 predetermined telephone numbers, said automatic
16 repertory dialler control system being coupled in use
17 to said automatic telephonic message system and to said
18 automatic repertory dialler telephone, said automatic
19 repertory dialler control system functioning in use
20 upon initiation of an automatic telephonic message
21 function to cause said automatic repertory dialler
22 telephone to dial the first of said predetermined
23 telephone numbers, to recognise a resultant telephone
24 line tone or tones indicating the success or failure of
25 the connect attempt, upon recognition of a successful
26 connection to said first predetermined telephone number
27 to cause the message system to transmit said
28 predetermined message, then either upon the completion
29 of the transmission of said predetermined message or
30 upon recognition of a failure to connect to said first
31 predetermined telephone number, to repeat the foregoing
32 functional steps in respect of the second and then
33 subsequent ones of said predetermined telephone numbers
34 and to continue through said plurality of predetermined
35 telephone numbers until the foregoing functional steps

1 have been carried out in respect of the last of said
2 predetermined telephone numbers.

3
4 2. A control system as claimed in Claim 1, wherein
5 there are included means whereby, if said predetermined
6 message has not been transmitted to any one or more of
7 said predetermined telephone numbers, to repeat the
8 said cycle in respect of the predetermined telephone
9 number or numbers to which said predetermined message
10 has not been transmitted, and to continue said cycling
11 either until said predetermined message has been
12 transmitted to each of said predetermined telephone
13 numbers, or until said functioning of said automatic
14 repertory dialler control system is terminated.

15
16 3. A control system as claimed in any preceding
17 Claim, in combination with and coupled to an automatic
18 telephonic message system and an automatic repertory
19 dialler telephone.

20
21 4. A control system as claimed in Claim 3 wherein
22 said automatic telephonic message system comprises or
23 is comprised in an alarm system, which alarm system may
24 be adapted to the automatic protection of premises
25 against intrusion and/or fire.

26
27 5. A control system substantially as hereinbefore
28 described with reference to the accompanying drawings.

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34
35

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

9122280.2

Relevant Technical fields

(i) UK Cl (Edition K) H4K (KOB, KFD)

(ii) Int Cl (Edition 5) H04M 3/46, 11/04

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

G N CHAPMAN

Date of Search

19 FEBRUARY 1992

Documents considered relevant following a search in respect of claims 1 TO 5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2005964 A PROCESSOR Note page 1 lines 79 to 89	1 to 4

SF2(p)

kg - c:\wp51\doc99\fil000675

- 16 -

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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